

**REMARKS**

**I. Status of the Application.**

Claims 1, 4-6, 8, and 10 were pending in the Application as of the date of the Final Office Action. In the Final Office Action, the Examiner:

(a) rejected claim 1 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement;

(b) rejected claims 1 and 8 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite;

(c) rejected claims 1, 4 and 6 under 35 U.S.C. § 103(a) as allegedly being obvious over Japanese Patent Application No. 62235704 (Patent No. JP401081167A) to Tajima et al. ("Tajima") in view of U.S. Patent Application Publication No. US2002/0028380 of Tanjo ("Tanjo");

(d) rejected claims 8 and 10 under 35 U.S.C. § 103(a) as also allegedly being obvious over Tajima in view of Tanjo; and

(e) rejected claim 5 under 35 U.S.C. § 103(a) as allegedly being obvious over Tajima in view of Tanjo as applied to claims 1, 4, and 6, and further in view of U.S. Patent Application Publication No. US2003/0122983 of Nakai et al. ("Nakai").

In this Response, Applicant respectfully amends claim 10 and submits the following remarks. Applicant respectfully submits that the following remarks herein traverse or overcome the Examiner's rejections to the claims of the present Application, and that claims 1, 4-6, 8, and 10 are in a condition for allowance.

**II. No New Matter Is Introduced by Way of Amendment.**

Applicant respectfully submits that no new matter has been introduced by way of amending claim 10. Applicant respectfully submits that the amendment to claim 10, as referenced in Section III below, is made consistent with the Examiner's suggestion so that the claim is consistent with the specification. Accordingly, Applicant respectfully requests that claims 1, 4-6, 8, and 10 of the Application proceed to allowance for the reasons provided herein.

**III. The Rejection of Claim 10 Under 35 U.S.C. § 112, First Paragraph, is Overcome and Should be Withdrawn.**

In the Final Office Action, the Examiner rejected claim 10 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. In the rejection, the Examiner noted that "[t]he specification teaches the carbon material and electrode active material formed on the current collecting substrate, but not the other way around as claimed," requiring appropriate correction. Final Office Action, pages 2-3.

In response, Applicant amends claim 10 consistent with the foregoing and consistent with the specification of the present Application. As such, Applicant respectfully submits that the rejection of claim 10 under 35 U.S.C. § 112, first paragraph, is overcome and should be withdrawn.

**IV. The Rejections of Claims 1 and 8 Under 35 U.S.C. § 112, Second Paragraph, are Overcome and Should be Withdrawn.**

In the Final Office Action, the Examiner rejected claims 1 and 8 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Specifically, and regarding claims 1 and 8, the Examiner rejected to the language added to claims 1 and 8 during the prior response to Final

Office Action, alleging that it was not clear as to where the "upper region" is located and that it was not clear as to what the density referred to (actual material or overall density) as claimed therein. Final Office Action, page 3-4. Applicant respectfully disagrees for the following reasons.

Regarding the phrase "upper region" as claimed in claims 1 and 8, Applicant respectfully submits that the phrase "upper region" is not indefinite in view of paragraph [0027] of the present Application. Paragraph [0027], in relevant part, reads as follows:

"The rod-shaped, sponge-shaped, or fiber-shaped protruding carbon material has a higher density (lower void percentage) *near the current collecting substrate* and a lower density (higher void percentage) *in the upper region*." (emphasis added)

As noted above, the carbon material is described, and claimed consistent with that description, as having a relative "higher density" and a relative "lower density." The "higher density" is described and claimed in claim 1 as being "near the current collecting substrate," and the "lower density" is described as being "in the upper region." Applicant respectfully submits that this description differentiates between an area "near the current collecting substrate" and the area "in the upper region," so by definition "the upper region" would not be near the current collecting substrate, which is not indefinite, and would be understood by one skilled in the art as written within the specification of the Application. Accordingly, the use of the phrase "upper region" in claims 1 and 8, and as described in Paragraphs [0026] and [0027] of the Application, is not indefinite, and the rejections of claim 1 and 8 under 35 U.S.C. § 112, second paragraph, regarding the use of said phrase should be withdrawn.

In addition, and regarding the use of the term "density" within claim 1, paragraph [0026] of the present Application reads as follows:

The rod-shape, sponge-shape, or fiber-shape shows the condition that the carbon material is formed on the substrate with differing void percentages. That is to say, rod-shape, sponge-shape, or fiber-shape shows the condition that the carbon material has a void percentage like seaweed or algae. The rod-shape is a wide carbon material that protrudes into the upper region, for example the *density* is 1.4 g/cm<sup>3</sup> as a layer. The sponge-shape is the carbon material finer than the rod-shape that protrudes into the upper region, for example, the *density* is 0.75 g/cm<sup>3</sup>. The fiber-shape is even finer than the sponge-shape that protrudes into the upper region, for example the *density* is 0.4 g/cm<sup>3</sup>. The *density* of a typical layer or membrane is, for example, 2.4 g/cm<sup>3</sup>. The numerical values of these densities are just one example and can be selected as desired. The rod-shape may also be called cylindrical shape; the sponge-shape may also be called chain shape; and the fiber-shape may also be called filamentous shape. (emphasis added)

As noted above, the Application makes reference to densities in connection with the carbon material as claimed in claim 1 (or the "active electrode material" as claimed in claim 8). This is further supported by the above-referenced excerpt of paragraph [0027] that identifies that the "carbon material" has a higher density, or lower void percentage, at one area and a lower density, or higher void percentage, at another area. Applicant respectfully submits that one skilled in the art would understand this language as it is clear within the specification of the present Application. In addition, the term "porosity" as referenced by the Examiner is used only once within paragraph [0080] of the Application, and is not used in a manner that would conflict with the use of the references to a higher density (or lower void percentage) and to a lower density (higher void percentage) as referenced in paragraph [0027]. Accordingly, the use of the term "density" in claims 1 and 8, as described in paragraphs [0026] and [0027] of the

Application, is not indefinite, and the rejections of claim 1 and 8 under 35 U.S.C. § 112, second paragraph, regarding the use of said term should be withdrawn.

**V. The Rejection of Claims 1, 4, and 6 Under 35 U.S.C. § 103(a) as Allegedly Being Obvious Over Tajima in View of Tanjo is Overcome and Should be Withdrawn.**

Applicant respectfully submits that the rejection of claims 1, 4, and 6 under 35 U.S.C. § 103(a) is overcome and should be withdrawn because Tajima and Tanjo, either alone or in view of one another, do not disclose all of the limitations of independent claim 1, for which rejected claims 4 and 6 are dependent therefrom.

As required under *Graham v. John Deere Co.*, the first steps in determining obviousness is to determine the scope and content of the prior art and ascertain the differences between the prior art and the claims at issue. 383 U.S. 1, 17-18 (1966). "In determining (such) differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." MPEP § 2141.02. In addition, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure. MPEP § 2143 (citing *In re Vaeck*, 947 F.2d at 493).

In addition, and to establish *prima facie* obviousness, "there must be some suggestion or motivation, in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine teachings." MPEP §2143; *see also In re Dance*, 160 F.3d 1339, 1343 (Fed. Cir. 1998); *Heidelberger Druckmaschinen v. Hantscho*

*Commercial*, 21 F.3d 1068, 1072 (Fed. Cir. 1994); *In re Geiger*, 815 F.2d 686, 688 (Fed. Cir. 1987); *Lindemann Maschinenfabrik v. Am Hoist and Derrick*, 730 F.2d 1452, 1462 (Fed. Cir. 1984). The suggestion to make the claimed combination *must come from the prior art and not from the applicant's disclosure or from the level of skill of the art*. *Id.* (citing *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991)); MPEP §2143.01 (citing *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308 (Fed. Cir. 1999)). "It is insufficient to establish obviousness that the separate elements of the invention existed in the prior art, absent some teaching or suggestion, in the prior art, to combine the elements." *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957 (Fed. Cir. 1997). The fact that prior art references can be modified or combined is insufficient to meet this criterion – those references must also suggest the desirability of the combination. MPEP §2143.01 (citing *In re Mills*, 916 F.2d 680, 682 (Fed. Cir. 1990); *see also In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998)). Moreover, the fact that the modification or combination would be well within the ordinary skill in the art, by itself, is insufficient to meet this criterion. *Al-Site Corp. v. VSI Intern., Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999); *Ex parte Levengood*, 28 U.S.P.Q.2d 1300, 1302 (Bd. Pat. App. & Inter. 1993).

Applicant respectfully disagrees with the rejection of claims 1, 4, and 6 for at least the reason that Tajima and Tanjo do not teach, disclose, or suggest a current collecting structure comprising a current collecting substrate with a carbon material formed thereon having a higher density near the current collecting substrate and a lower density in an upper region as claimed in claim 1. In addition, and to be motivated to combine the references, one skilled in the art, without the teaching of the Applicant's disclosure, would have to look at Tajima and Tanjo and

determine that some benefit would result from using carbon on a current collecting substrate and having the carbon present at two different densities, and Applicant respectfully submits that no such motivation exists within the cited art.

Regarding claim 1, Applicant respectfully submits that Tanjo does not teach, disclose, or suggest a carbon material formed on a current collecting substrate whereby the carbon material has differing densities at various regions as claimed in Applicant's claim 1. Conversely, Tanjo does not disclose any embodiment of a positive electrode that uses carbon as an active material (noting that the "current collecting structure" as claimed in Applicant's claim 1 refers to an electrode structure of positive electrodes as noted in paragraph [0023] of the present Application).

As noted in paragraph [0033] of Tanjo, various positive electrode active materials are listed, including several lithium metal oxides. Applicant respectfully submits that there is no reference within Tanjo, either within paragraph [0033] or otherwise within that reference, that discloses, teaches, or suggest a positive electrode active material comprising carbon as claimed in Applicant's claim 1.

Applicant respectfully submits that the failure of Tanjo to disclose or even consider the use of carbon overcomes the present rejection of claim 1 over Tajima in view of Tanjo. In particular, and as noted above, the various lithium metal oxides as referenced in Tanjo are clearly different that the carbon active materials referenced within the present Application and as referenced in Tajima. Applicant respectfully submits that one skilled in the chemical arts would be able to clearly differentiate between lithium metal oxides and carbon, and would clearly

understand their differing properties and compositions. Accordingly, and as explained in further detail herein, the comparison and potential use of a lithium metal oxide in one reference in connection with a carbon in another reference would require some sort of inherent teaching or motivation within said references to use one material instead of another, especially given their drastically different compositions and properties.

In addition, and as noted within the Final Office Action, the Examiner agrees that "Tajima does not disclose the density of the carbon material on the current collecting substrate," but then alleges that Tanjo discloses "analogous art of a battery having a high power and energy density." Final Office Action, page 5. Although the Examiner makes reference to power and energy densities within the rejection, as such terms are referenced within Tanjo, Applicant respectfully submits that "power density" and "energy density" are not the same types of densities as claimed in claim 1 and as described within the present Application.

For example, paragraph [0068] of Tanjo reads as follows:

As described above, in the rechargeable lithium ion battery of this embodiment, the high *power density* can be obtained while maintaining the *energy density*. Therefore, it can be utilized best as a power source of the electric vehicle and the hybrid vehicle. (emphasis added)

Applicant respectfully submits that as referenced and used above, the terms "power density" and "energy density" within Tanjo are clearly different from one another. Said terms are further described in paragraph [0007] of Tanjo, whereby energy density ("i.e. energy per unit weight or energy per unit volume") is differentiated from power density ("power per unit weight or power per unit volume"). Applicant respectfully submits that out of the over 100 uses of the word "density" within Tanjo, each and every use thereof is preceded either with the word

"energy" or the word "power." Conversely, and as described in Section IV above, "density" as used within applicable paragraphs [0026] and [0027] of the present Application and in the claims, refers to the density of the carbon material / electrode active material on the current collecting substrate as claimed in claims 1 and 8 of the present Application. Accordingly, and although the term "density" is used within Tanjo, its internally defined use clearly differs from the use of the term "density" as relating to the carbon material / electrode active material in the present Application.

In addition, Applicant respectfully submits that the positive electrode active material of Tanjo is formed by "the positive electrode active material [being] *mixed with a binder* in a solvent to be in a paste state, and the paste is coated on the positive electrode collector, and dried." Tanjo, paragraph [0035], emphasis added. Therefore, Applicant respectfully submits that combining Tanjo with Tajima would result in an electrode structure that utilizes a binder contrary to the limitations of claim 1.

Furthermore, and as noted in Tanjo, "the porosity of the active material layer can be adjusted by changing pressure when pressing the layer after the paste containing the positive electrode active material and the conductive material is coated on the collector and dried." Tanjo, paragraph [0059]. Tajima's abstract discloses only a single compression carried out after vapor deposition not coating with a paste including a binder. Therefore, it is understood that the presence of the binder and multiple pressings are necessary to obtain the differing porosities in Tanjo, and Tajima stresses the lack of a binder and only a single pressing. Applicant respectfully submits that Tajima teaches away from using the active material of Tanjo, which includes a

binder, since Tajima emphasizes the use of no binder and no conductive material. Accordingly, Applicant respectfully submits that either Tanjo and Tajima teach away from their combination, or that such a combination would result in an inoperable device.

In addition, Tanjo also indicates that the amount of binder may affect the porosity. As referenced within Tanjo, "[t]he porosity was adjusted by the amount of the solvent, drying conditions and the pressing of the electrode" (paragraph [0075]), leading to the possibility that an inoperable combination would be created if the binder is removed from the active material of Tanjo et al. as required by the claims and Tajima et al.

Therefore, and consistent with the foregoing, (i) all of the elements and limitations of claim 1 are not disclosed by combining Tanjo and Tajima, (ii) there is no inherent motivation or suggestion to combine Tanjo and Tajima within said art as required for a *prima facie* allegation of obviousness, and (iii) Tanjo and Tajima either teach away from one another, or their combination would result in an inoperable device as referenced above. Applicant respectfully submits that there is no *prima facie* case of obviousness in view of Tajima and Tanjo with respect to rejected independent claim 1. Accordingly, and at least for the reasons stated above, Applicant respectfully submits that the rejections of claim 1 under 35 U.S.C. § 103(a) over Tajima in view of Tanjo is overcome and should be withdrawn.

In addition, Applicant respectfully submits that the rejection of claims 4 and 6 in view of Tajima and Tanjo is now moot and should be withdrawn because claims 4 and 6 depend from nonobvious claim 1. "If an independent claim is not obvious under 35 U.S.C. §103, then any claim depending therefrom is not obvious." MPEP § 2143.03 (citing *In re Fine*, 837 F.2d 1382,

1385 (C.C.P.A. 1970)). As claims 4 and 6 depend from nonobvious claim 1, the rejection of claims 4 and 6 is moot and should be withdrawn.

**VI. The Rejection of Claims 8 and 10 Under 35 U.S.C. § 103(a) as Allegedly Being Obvious Over Tajima in View of Tanjo is Overcome and Should be Withdrawn.**

Applicant respectfully submits that the rejection of claims 8 and 10 under 35 U.S.C. § 103(a) is overcome and should be withdrawn because Tajima and Tanjo, either alone or in view of one another, do not disclose all of the limitations of independent claim 8, for which rejected claim 10 is dependent therefrom.

Applicant respectfully disagrees with the rejection of claims 8 and 10 for at least the reason that Tajima and Tanjo do not teach, disclose, or suggest an electrode structure having an electrode active material on a current collecting substrate whereby the electrode active material has a density of less than or equal to 1.4 grams per cubic centimeter in an upper region as claimed in claim 8.

Applicant respectfully submits that the majority of the arguments presented in the rejection of claim 8 and 10 are the same, or substantially similar to, the rejections presented in view of claims 1, 4, and 6. Accordingly, Applicant respectfully reiterates each argument referenced above by reference as also being applicable to rejected claims 8 and 10.

In particular, and as noted above, Applicant respectfully submits that the positive electrode active material of Tanjo is formed by "the positive electrode active material [being] *mixed with a binder* in a solvent to be in a paste state, and the paste is coated on the positive electrode collector, and dried." Tanjo, paragraph [0035], emphasis added. Therefore, Applicant

respectfully submits that combining Tanjo with Tajima would result in an electrode structure that utilizes a binder contrary to the limitations of claim 1.

The aforementioned arguments in view of the fact that the combination of Tajima and Tanjo do not teach, disclose, or suggest an electrode structure having an electrode active material with a density "less than or equal to 1.4 grams per cubic centimeter in an upper region" as claimed in Applicant's claim 8 overcomes the rejection thereto no *prima facie* case of obviousness has been presented with respect to said claim.

Therefore, and consistent with the foregoing, (i) all of the elements and limitations of claim 8 are not disclosed by combining Tanjo and Tajima, (ii) there is no inherent motivation or suggestion to combine Tanjo and Tajima within said art as required for a *prima facie* allegation of obviousness, and (iii) Tanjo and Tajima either teach away from one another, or their combination would result in an inoperable device as described in detail in Section V. Accordingly, and at least for the reasons stated above, Applicant respectfully submits that the rejections of claim 8 under 35 U.S.C. § 103(a) over Tajima in view of Tanjo is overcome and should be withdrawn.

In addition, Applicant respectfully submits that the rejection of claim 10 in view of Tajima and Tanjo is now moot and should be withdrawn because claim 10 depends from nonobvious claim 8. "If an independent claim is not obvious under 35 U.S.C. §103, then any claim depending therefrom is not obvious." MPEP § 2143.03 (citing *In re Fine*, 837 F.2d 1382, 1385 (C.C.P.A. 1970)). As claim 10 depends from nonobvious claim 8, the rejection of claim 10 is moot and should be withdrawn.

**VII. The Rejection of Claim 5 Under 35 U.S.C. § 103(a) as Allegedly Being Obvious Over Tajima in View of Tanjo as Applied to Claims 1, 4, and 6 and Further in View of Nakai is Overcome and Should be Withdrawn.**

Applicant respectfully submits that the rejection of claim 5 under 35 U.S.C. § 103(a) is overcome and should be withdrawn because Tajima and Tanjo, either alone or in view of one another, do not disclose all of the limitations of independent claim 1, for which rejected claim 5 is dependent therefrom. Applicant respectfully submits that the rejection of claim 5 in view of at least Tajima and Tanjo is now moot and should be withdrawn because claim 5 depends from nonobvious claim 1. "If an independent claim is not obvious under 35 U.S.C. §103, then any claim depending therefrom is not obvious." MPEP § 2143.03 (citing *In re Fine*, 837 F.2d 1382, 1385 (C.C.P.A. 1970)). As claim 5 depends from nonobvious claim 1, the rejection of claim 5 is moot and should be withdrawn.

**VIII. Petition for an Extension of Time to Submit the Present Response.**

Applicant respectfully petitions for an extension of time of two (2) months, under 37 C.F.R. § 1.136(a), thereby extending the deadline for response, pursuant to 37 C.F.R. §§ 1.7(a) & 1.136(a), to September 16, 2010. Applicant shall authorize payment for this extension in the amount of \$255.00 (small entity) via credit card at the time of electronically filing the present Response.

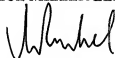
**CONCLUSION**

For all the foregoing reasons, it is respectfully submitted that Applicant has made a patentable contribution to the art and that this response places the Application in condition for allowance. Accordingly, favorable reconsideration and allowance of claims 1, 4-6, 8, and 10 of this Application is respectfully requested.

In the event Applicant has inadvertently overlooked the need for a payment of a fee or extension of time, Applicant conditionally petitions therefor, and authorizes any fee deficiency to be charged to deposit account 09-0007. When doing so, please reference the above-listed docket number.

Respectfully submitted,

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